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AUTHOR Showalter, John
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ABSTRACT

Training state vocational education staff to generate and utilize labor market data was the purpose of this project. The objectives were to develop the capability to generate and integrate into a management information system labor market supply and demand data compatible with vocational education taxonomies; to train selected staff to perform the data generation and integration function; to involve all staff in identifying content and reporting format for management information data; and to train all staff in the effective use of the management information system (MIS). An initial training conference was held with state supervisors to identify MIS needs. Then labor market data was developed for each vocational education planning district in the state and a guide was produced for use in local and state planning. Other meetings with local education agency planners were later held to distribute the labor market forecasts and train them in the use of MIS data in local planning. Included in this final report are the descriptions of the methodology used to develop the final product and materials used in the training conferences, an evaluation proposal, and the interim results. (Author/BM)

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ED145147

USING LABOR MARKET FORECASTING FOR VOCATIONAL EDUCATION PLANNING

BEST COPY AVAILABLE

Ohio Department of Education
Division of Vocational Education
Columbus, OH 43215

Dr. John Showalter, Principal Investigator
R. D. Balthaser, Project Director

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Ohio EPDA Project No. 73011

September 1, 1973 to December 31, 1974

Total Funds expended: $_____

CE 012 782

ABSTRACT

TITLE: Development of, and training in, the use of a management information system by the state staff.

SPONSORING AGENCY: The Ohio State University, Columbus, Ohio

PROJECT COMPLETION DATE: August 31, 1974

APPROVED BUDGET AND ACTUAL COSTS:

Priority for Project: Labor market demand and supply data compatible with vocational-technical education taxonomies is difficult to obtain. The state staff function to help local education agencies plan and implement an adequate vocational education program which necessitates having access to valid labor market supply and demand data on a local, regional, and state basis. Since it is difficult to generate sufficient data which is compatible with vocational education taxonomies with existing agencies and resources, a concentrated effort to train staff to generate and utilize data is essential.

Objectives: The purpose of this project was to make compatible data available and train the state staff in generation and utilization techniques. This purpose was accomplished with the following objectives:

-- to develop the capability within the Division to generate and integrate into a management information system labor market supply and demand data compatible with vocational education taxonomies;

-- to train selected staff to perform the data generation and integration function;

-- to involve 100% of the staff in the identification of content and reporting format for management information data;

-- to train 100% of the state staff to be aware of and effectively use the management information system.

Strategies to meet Objectives: An initial training conference was held with state supervisors in the fall to identify management information system needs. Following this meeting, labor market demand and supply data was developed for each vocational education planning district in the state and a guide was produced for the use of local and state education planners. A spring conference was held with state level supervisors to train them in system utilization techniques for state level planning. An additional series of meetings with local education agency planners was then held where labor market forecasts were distributed and training given in the use of management information system data in local planning.

In general, all objectives were met to the degree of conducting the necessary training conferences and developing the management information system data.

The reader is referred to the attached project report which describes in detail the methodology used to develop the final product and the materials used in local and state level training conferences. An evaluation proposal and the interim results are included in this report.

Participants: 144 state directors, supervisors and teacher educators in vocational education were involved in the state level training conferences. Approximately 344 local education agency personnel participated in the regional meetings. State level conferences included all state supervisors and teacher educators at Universities in Ohio.

Evaluation Procedures: This is described fully in Appendix E of the attached report.

Strengths and Weaknesses: The single most obvious strength would be an initial attempt to break down labor market forecasts into individual vocational education planning districts. This is the first attempt that we are familiar with in the country. A second strength would be the effectiveness in getting local education agency planners, as well as state supervisors, to utilize a systematic approach to vocational education planning. Apparently, a number of plans have been developed in the past without using meaningful data input prior to decision-making. The most noticeable weakness, since it is a first attempt, would be a need to improve upon the method used to break-down labor market demand data into individual planning districts. There is a new method just developed by IBM which allows for a more accurate method of determining census data in small population tracts. This could be explored in future attempts to forecast at the local level.

Impact on Educational Delivery System: This project has developed data and instrumentation which should further enhance the educational decision making of state and local planners. This in turn should lead to the improvement of quality service to students in vocational education programs as planners do a better job of providing vocational training with job placement as the end goal. Initial feedback so far indicates that this project has had a significant impact on planning for the 1974-75 school year.

O H I O

FINAL REPORT OF EPDA PROJECT 73011
Part F, Section 553

Title of Project:

Development of, and Training in, the Use of a Management Information System by the State Staff.

Sponsoring Agency:

The Ohio State University, Columbus, Ohio

Date Project Completed:

December 31, 1974

Priority:

Priority A included the training of state staff to assist the local education agencies in planning and implementing adequate vocational education programs through the use of better labor market supply and demand information.

Project Results:

OBJECTIVES:

1. To develop the capability within the Division to generate and integrate into a management information system labor market supply and demand data compatible with vocational education taxonomies.

   Result:

   Two computer systems were generated:

   1) Translation of BES data into OE taxonomies for the 108 LEA districts called Vocational Education Planning Districts, (VEPD).

   2) Generation of program to record historical and projected enrollments and units of operation for each taxonomy in the state, and in each of the 108 VEPD's in the Business and Office Education service.

   In addition, data staff in the Research, Surveys, Evaluation, and Exemplary Programming service were trained in the maintenance of these programs for the future.

2. To train selected staff to perform the data generation and integration function.

   Result:

   Each of the service Assistant Directors on the state staff were trained in two sessions to examine the data, make projections, and to up-date print-outs annually.

3. To involve 100% of the staff in the identification of content and reporting format for management information data.

Result:

One initial two-day conference was held for all state staff and teacher educators of a number of Ohio colleges and universities. The purpose of the conference was to submit to the conferees the latest methods and information that was available in labor market information series around the country, processes for synthesizing the information, and to have them react and submit their ideas of what they felt was needed in a state system which would help local education agencies in planning for vocational education.

Various systems were examined including the Oklahoma OTIS system, an internal PPBS system at The Ohio State University, the complete display of internal data and reports within the Ohio Department of Education as well as the Vocational Division, and 15 sources of external data from the decennial Census, Ohio Employment Service, and other sources.

The output of the conference included recommendations from each of 10 service areas examining their own programs and the needs for specific data to assist in labor/education decisions in those areas.

One sidelight of this fall conference was the generation of a project to train LEA personnel in the use of the generated information by the state staff trained in this project.

The project staff then put together the various requirements, merged similar requirements, eliminated extraneous requests, and condensed existing SDE files into a workable format.

4. To train 100% of the state staff to be aware of and effectively use the management information system.

Result:

A two-day spring training conference was conducted for state staff to display the information systems generated, experience planning in a simulated district in role playing models, and establish basis for additional changes and needs from the generated programs.

Successive days were spent in four regions of Ohio with the vocational LEA management personnel in training them in the use of the information system (LEAP project). The MIS project personnel presented the system at each of these meetings and consulted with LEA's where assistance was needed and state staff were unable to answer specific questions.

IN SUMMARY:

The project met objectives stated but did not exceed expectations. The Ohio Advisory Council for Vocational Education generated an evaluation study which will be forthcoming in the spring, 1975, on this system. On

..the other hand, feed-back from several of the LEA's has indicated that the labor market information was tailored very well to their districts, produced data which was quite well born out by subsequent skill surveys in their districts. Information in the Agriculture segment was in conflict and was subsequently adjusted to a more reasonable basis. Further refinements will have to be exercised in succeeding years due to better data obtained, better understanding of the I-O Matrix from the USDL, and feed-back from the LEA's concerning their localized adjustments based on more closely aligned scruitinization.

Participants:

144 state directors, supervisors, and teacher educators were involved in the process. Absentee personnel were provided materials supplied in both conferences for all personnel.

All state staff and vocational teacher educators were invited to the conferences and expenses for the conference were provided. Time was provided from existing budgets.

Evaluation Procedures:

Three procedures were proposed:

1. To evaluate selected state supervisors ability to accomplish the following tasks: Identify, evaluate, and utilize information at both state and LEA levels; and to effectively assist LEA staff in using the information system.

   Result:

   A sample of 21 raters from state staff were measured by their responses on a 5-point Likert Scale, (attached), which indicated:

   a) The highest rating was given to the fact that the system was helpful to the state level planners in projecting programs over the next five years.

   b) The lowest ratings, (although still above average), showed a suspicion of the accuracy of the manpower forecasts.

   This seems incongruous since the raters also felt the data was useful in their planning but the tendency to reject some specific occupational projections in the LEA report which looked out of line with personal knowledge of the community would influence this response.

2. To evaluate the effectiveness of a program designed to generate and integrate into a management system that local educators could use was assessed in a 9-point Likert Scale instrument administered in each of the four regional meetings.

   Result:

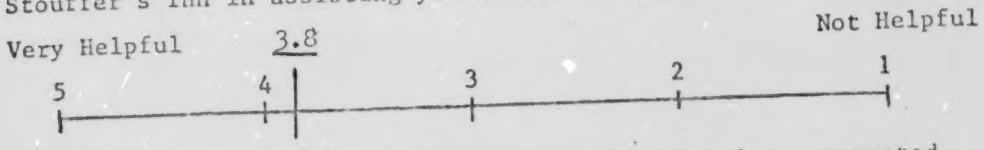
   Responses at the meetings were above average in each region as follows:

Northwest	5.70
Southwest	5.97
Southeast	6.41
Northeast	6.32

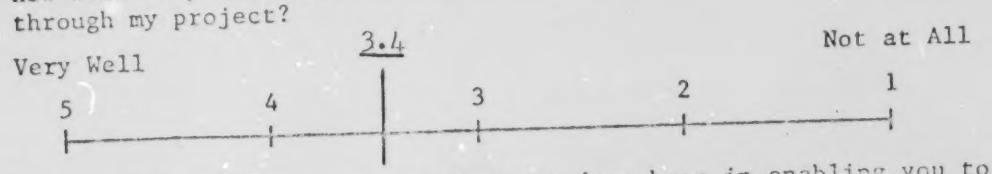
AN EVALUATION OF EPDA PROJECT #73011
John M. Showalter

Please read each question and circle the appropriate number indicating your response: (Mean responses for raters are indicated above each scale)

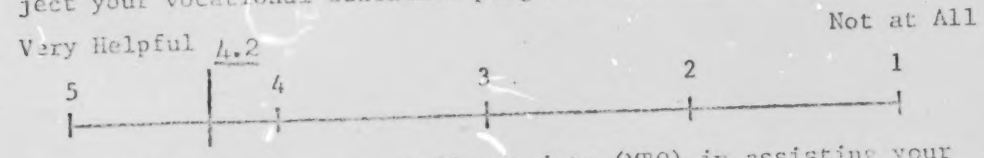
1. How helpful were the fall and spring state conferences held at Stouffer's Inn in assisting you in vocational education planning?



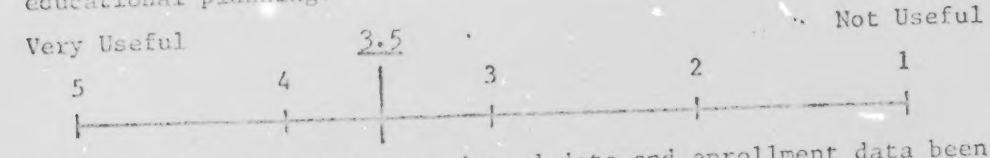
2. How well do you understand the manpower forecast data generated through my project?



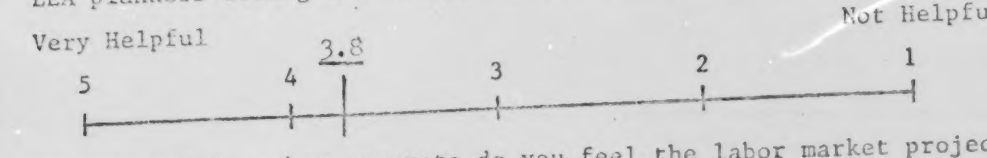
3. How helpful has the manpower forecast data been in enabling you to project your vocational education programs over the next five year period?



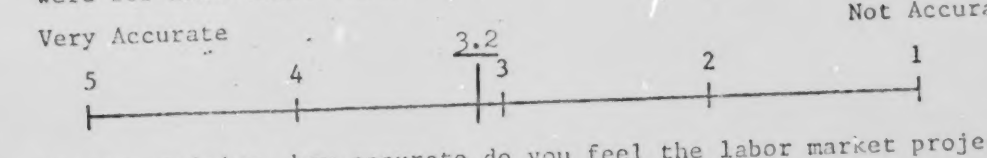
4. How useful was the past enrollment data (MBO) in assisting your educational planning?



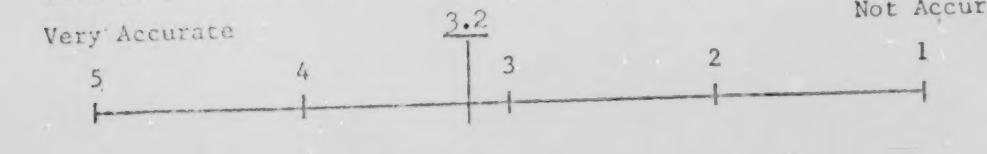
5. How helpful has the manpower demand data and enrollment data been to LEA planners during the series of LEAP conferences held this spring?



6. In your opinion, how accurate do you feel the labor market projections were for individual VEPDs?



7. In your opinion, how accurate do you feel the labor market projections were at the state level?



3. An effort will be made to measure the accuracy of the labor market forecasts over the 1-5 year periods. The first will be done in spring of 1975 after the I-O print-out is disaggregated into each 108 VEPD's. A subsequent comparison will be made in 1979 to see the comparison.

   The proposed evaluation plan suggested a ± 10% variation would be permissable in an individual taxonomy projection of employment in that period of time from the industry-occupation matrix. The Research, Surveys, Evaluation, and Exemplary Program service will make the analysis.

Impact on Educational Delivery System:

1. A trained staff has been developed who rely on the system to generate and feed-back information for management purposes in the Division of Vocational Education.

2. The Division has been able to establish computer systems and programs to accept data from the Bureau of Employment Service (BES), I-O Matrix and process it into disaggregated display for each of the 108 VEPD's in Ohio.

3. The state staff has had one year's use of the system in making joint management decisions with the LEA's.

4. This information availability has been added to each of the teacher training programs, especially at the administration certification program and the Kent State University administrator intern program.

5. The ability of the state and each LEA to look at such projections of both supply of students and demand of the occupations reduces the communication gap in program planning by putting both groups in a democracy on the same data base.

Materials Developed:

1. An unpublished document entitled, "Using Labor Market Forecasting for Vocational Education Planning" has been generated and is attached. Xerox copies are available for the price of reproduction from the Division.

2. Two computer systems have been developed:

   a) Labor Market Demand Data, disaggregated for 108 VEPD's.
   b) Supply Data, disaggregated by 108 VEPD's.

   Both systems are listed in the appendix of the publication listed above, and are up-dated annually by the Division data staff.

Fiscal Status:

See attached report.

APPENDIX

TABLE OF CONTENTS

I. Introduction. 1

II. Review of Previous Research 2

III. Methodology 11

IV. Some Suggested Uses of Vocational Education Planning Data 21

Figures

1. A Flow Chart Model of the OTIS System 5

2. Project Flow Chart. 12

Tables

1. Percentage Growth Rates 20

2. Labor Demand and Follow-Up Data 23

3. Adjustments for Estimated Graduates 24

4. Adjustments for Other Sources of Supply 24

Appendices

A. National Industry-Occupational Matrix Tables

B. Labor Market Demand Data

C. Previous Enrollment by Education Taxonomy (MBO)

D. V.E.P.D.s in Ohio

E. Project Evaluation Plan

I. INTRODUCTION

This report covers one phase of an EPDA-funded research project through The Ohio State University, dealing with the development of Labor Market Supply and Demand data compatible with vocational education taxonomies. The overall intent of the project was to develop a Management Information and Planning System (MIPS) for the Ohio State Department of Education, Division of Vocational Education. An adjunct system is available which covers other aspects of the total system.

An initial conference was held in the Fall of 1973 with vocational education supervisors from the State Department of Education and teacher educators from a number of Ohio's colleges and universities. The purpose of the conference was to determine the kinds of data that are needed by educational planners in Ohio and to train the state staff in generation and utilization techniques. As a result of this conference, another system called "Local Education Agency Planning (LEAP)" was developed.

This project assumed responsibility for the collection of external types of data, with primary focus on labor market demand data. Other data input discussed in the LEAP report include the following: student enrollment by grade levels, average cost per pupil, equipment depreciation costs, space requirements for vocational education programs, environmental assumptions, school district population growth, average student attrition rate, follow-up data on vocational education graduates, vocational interest inventory, adult vocational enrollment, and percent of vocational students entering higher education.

OBJECTIVES

The purpose of this project was to make compatible data available and

train the state staff in generation and utilization techniques. This purpose was accomplished with the following objectives:

--to develop the capability within the Division to generate and integrate into a management information system labor market supply and demand data compatible with vocational education taxonomies;

--to train selected staff to perform the data generation and integration function;

--to involve 100% of the staff in the identification of content and reporting form for management information data;

--to train 100% of the state staff to be aware of and effectively use the management information system.

II. REVIEW OF PREVIOUS RESEARCH

A number of different states have completed management information system studies, dealing with occupational supply and demand related to vocational education programs. The following capsule summaries attempt to review some of the highlights of major programmatic efforts to date.

North Carolina State University

Robert T. Williams at North Carolina State University (1971) attempted to obtain and analyze occupational supply and demand data to be used for state level program planning in occupational education. Supply data came from enrollment figures of post-secondary curricula, Manpower Development and Training Act (MDTA) classes, New Industry classes, and secondary curricula. Only enrollment figures from those classes which matched occupations listed in the Employment Outlook for Selected Occupations in North Carolina, 1966-1970, were used in this report. Consequently, out of 107 listed occupations, 44 having no pre-employment training programs

have no reported figures. In addition, this source document uses area skill surveys with an inherent limitation that covers only manufacturing and construction industries.

Another limitation to Williams' study was the overlapping of demand projections made by several construction companies for one particular job when only one company will actually get the job. Supply data was limited by missing records, the use of secondary sources, and incorrect or inadequate use of reporting forms.

Data in this study was arranged in tabular form which included the completion rates and enrollment for the four supply data sources. The table shows numbers of graduates from four sources of supply compared to the projected demand in these occupations. The five-year accumulated demand was given.

Pennsylvania State Department of Education

Pennsylvania's Research Coordinating Unit division of the State Department of Education has developed one of the more sophisticated supply models (1973), using a modified version of the national industry-occupational matrix to project the future supply of vocational school graduates. In order to determine the projected supply, two basic techniques were used:

1. A survey of the institutions offering the occupational training programs
   a. Pennsylvania's Public Secondary Schools and Area Vocational Technical Schools
   b. Pennsylvania's Post-Secondary Schools
2. An extrapolation of historic data
   a. Manpower Development Training Programs
   b. Bureau of Vocational Rehabilitation Programs
   c. State Retraining Programs

Modified trend lines were extrapolated from these various sources of supply to project estimated graduates for 1975 and 1980. Major educational taxonomies are covered in this approach.

Oklahoma State Department of Education

The Occupational Training Information System (OTIS), developed by the Oklahoma State Department of Education (1974), represents a departure from other models in four major respects:

1. A technique for continuing critical self-evaluation is included.
2. The system is designed along a time dimension, recycling each year.
3. The model incorporates a recognition of the interaction between forecasting and sociopolitical environment.
4. The model includes a subsystem which relates the labor market to "disadvantaged" workers.

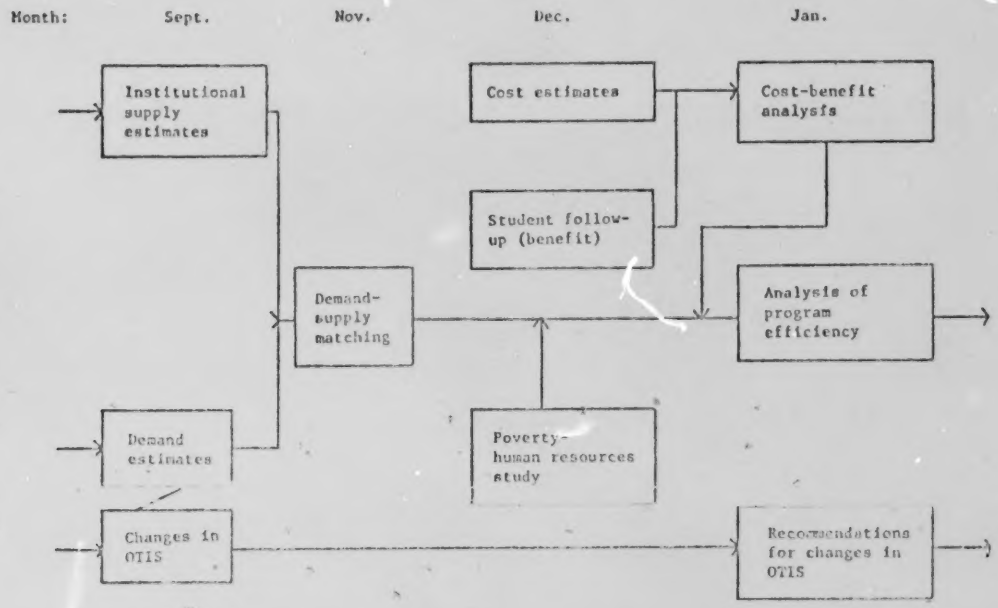
Because of its unique features, the OTIS model will be discussed in some detail here.

Figure 1 represents a simplified version of the flow diagram found in the OTIS Final Report (1970). The most recent publication from OTIS (1974) includes supply/demand projections using this model for 11 regions in Oklahoma. A regular collection of supply data from public, and private (an innovation) vocational education institutions would be accompanied, once the system is functioning, by demand reporting from employers. "Industrial coordinators", personnel from the vocational education system, are to be used to secure employer information. Non-institution supply sources (the unemployed, and the individuals learning skills on the job) are estimated from records of the state employment security office. Matching demand and supply information by occupation is followed by development of educational curricular implications through use of Voca-

tional Education and Occupations classifications.

Figure 1

A Flow Chart Model of the OTIS System



Current and projected state and regional imbalances, by occupations, will be calculated. The system should yield supply-demand parameters, along with parameters developed in cost-effectiveness analysis of the system. As part of the process, an Advisory Committee, which includes employer-representatives, education officials and OTIS staff, monitors the process and recommends needed changes.

Since OTIS represents an attempt not only to forecast manpower requirements but also to develop a state-level information system, primary data used in an illustrative exercise were generated from institutional surveys. When primary estimates proved inadequate, OTIS staff sought supplementary information. For example, slippage between graduation from vocational

school and job market entry was estimated through a combination of state and national data. Employment security data on registrants "available for placement" with out-of-state addresses were used in an estimate of outmigration (although there appeared to be no attempt to estimate in-migration).

OTIS staff offered a useful critique of their own model at its current state of development:

1. Not all jobs are included in projections. They expect this gap to cause an understatement of demand.
2. The system yields no information on education-experience complementarity. This, of course, is a failing common to most forecasting models, and is based mainly on the lack of systematic research into alternative routes to different occupational levels.
3. Some individuals listed as available from non-institutional sources (in-plant training and unemployment data from employment security records) are not in fact qualified for jobs in their listed category.
4. There are some inconsistencies between regional and state occupational totals. Some occupations could not be identified at the regional level.

In addition, we note several problems applicable to OTIS and to systems models generally:

1. Information on non-institutional supply sources is particularly poor. Reliance on employment security records forces a serious underestimate of the numbers of individuals who gain skills through on-the-job experience.
2. OTIS covers the manufacturing sector quite comprehensively, but its treatment of services and government (the state's fastest growing

sectors) is much needed. Whereas contacts with manufacturing industries are renewed annually, the services benchmark is subject to rapid obsolescence.

3. OTIS uses wage data to help explain inter-state migration, but inter-state wage differentials are not used to explain supply-demand adjustments in Oklahoma labor markets. (This problem applies with more or less equal force to all technological forecasting models.)
4. In this view, regional imbalances are presumed to be immutable during the forecast period. The assumption of zero intra-state mobility may be reasonable for a short period, but longer-range projections should allow for the possibility that surplus regions contribute labor to shortage regions. (A noted problem on Ohio's borders.)
5. Teachers and students showed considerable disagreement when asked to judge the relevance of vocational education curriculum to job content. There is no standard to judge the "right" answer in this case.
6. Aside from the reporting-budgeting needs of any state agency, it is not wholly clear that a one-year cycle is desirable for all phases of system planning and forecasting. The short-term cycle may have to be integrated onto one or more long-term cycles covering programs with multi-year gestation periods.
7. The evaluation phase of OTIS is being developed. Supporting wage data, though available as mentioned, is not used fully. Control for evaluation of vocational education programs based on data from drop-outs may have serious unknown biases, depending on the array of factors which caused individuals to leave school.
8. The percent of expected demand which is to be filled from each supply source is based on the percent of supply currently emanating from that source. There is no available way of knowing the extent to which

employers prefer this pattern or how generally optimal the pattern is in an economic sense.

9. Manpower demand data is still based upon the use of area skill surveys, with their inherent limitations.

Nevertheless, the OTIS technique, perhaps the most comprehensive of the systems models discussed, remains a well-conceived method for assembling and organizing labor market information. It is understandable to administrators as well as to trained economists, and it involves interested groups from industry and education in the forecasting process itself. If spin off from this interaction includes better understanding between industrialists and vocational education personnel, then the program will have had a positive impact within the limits of its forecasts.

North Carolina Occupational Information Center

The Occupational Information Center in North Carolina (1973) developed a supply/demand model containing the following three information-gathering systems:

1. A system for surveying business and industry to collect information on the occupational distribution of the local force and on the projected trends in employment by occupations.
2. A system to determine the aspirations of the local high school seniors in order to identify potential students for technical institutes and community colleges.
3. A system for follow-up surveys of students who have left an institution in order to determine the relationship between their job and the occupational education and training they received at the institution.

Employer's five-year needs are matched with follow-up data on 1971 voca-

tional graduates and dropouts, with student interests as measured by an interest survey. One of the major limitations of this study was the dependence on survey data to make occupational forecasts. In addition, no attempt was made to account for non-public secondary vocaional graduates in matchin projected supply with demand.

Alabama State Department of Education

The Alabama Division of Vocational, Technical and Higher Education conducted a study with Walter M. Arnold, Associates (1972) to make manpower projections by SMSA, using the national industry-occupational matrix. Projections were made on the basis of estimated annual occupational demand from 1972-1980. An interesting innovation was to rank order each of the Vocational Education Service areas by occupational need. While interesting, the usefulness of this approach seems questionable, since it is fairly obvious that large differences in occupational need will be found between service areas and within each area.

Another Alabama approach is providing occupational demand by SMSA only. While this might not be a major problem in more sparsely populated states, such an approach would eliminate many planning districts in rural areas of Ohio.

Washington State Department of Education

Washington has made use of the national industry-occupational matrix in forecasting occupations for vocational education (1974). To determine how employment would probably be distributed within the various occupations and within various industries, the 1970 census was used in matrix form. Each cell of the matrix contained the number employed in that occupation in that industry at the time the census was taken. There is a relationship

between each cell and the total of all cells for a particular occupation or a particular industry.

Following the development of occupational projections for 1974 and 1978, Washington then developed a guide for use in making recommendations for program growth. Comparisons were made between preparatory enrollment, placement, and overall demand in each taxonomy. In addition, they calculated the ratio of enrollments to placements and the percent of demand being met by the number of yearly placements. Recommendations could then be made on the basis of these ratios. For example, in order to recommend that a program should grow, the enrollment to placement ratio should be low, indicating good placement in that taxonomy. In addition, there must also be a significant demand for new hires and a significant unmet need in that occupation.

Washington also included a chart for each occupation showing trend lines of actual total enrollments, actual first year enrollments in a two-year program, actual completions, and actual placements. A "potential" enrollment line is calculated to indicate what the level of enrollment would be if there were a direct relationship between the work force mix and the school enrollment mix. This line is based on the assumption that the skills being developed by students in a comprehensive school system should reflect the skills of the world in which the student will live and work.

Summary

This brief review of current literature indicates that Management Information Systems and Manpower Forecasting Models have advanced in structure and interface in time. Many state agencies are beginning to use the

National Industry-Occupational Matrix in their manpower projections and they are slowly overcoming some of the deficiencies of local planning district forecasting. Various attempts have been made to match available supply with demand but there are still many shortcomings.

One of the major obstacles yet to overcome by state education agencies is the development of a valid methodology for projecting labor market openings at the local education agency level, using the National Industry-Occupational Matrix, rather than conducting local surveys. This study by the Ohio agency has attempted to do this as a major departure from previous studies.

III. METHODOLOGY

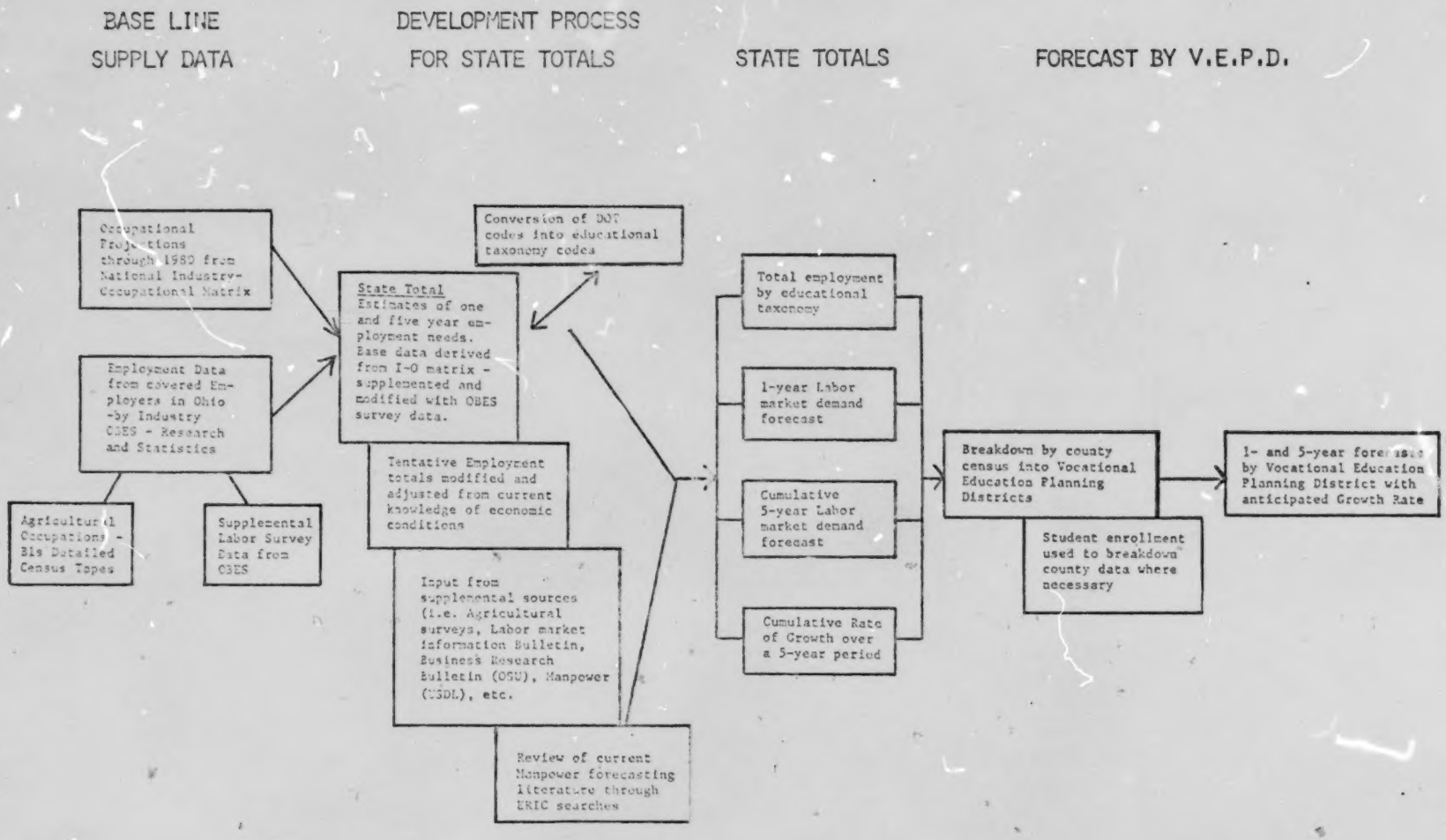
Using the National Industry-Occupational Matrix (I-O Matrix)

An Overview

Labor market forecasts were developed for the Ohio project using baseline Industry Employment data supplied by the Labor Statistics Department of the Ohio Bureau of Employment Services. One- and five-year forecasts were established using the national industry-occupational matrix developed by the Bureau of Labor Statistics (1970) and supplemented with Local Survey Data where appropriate. The following flow-chart illustrates the process of developing baseline data into finished manpower projections by Vocational Education Planning District. (See next page - Figure 2.)

The I-O Matrix is a technique which is becoming more common as a device for projecting occupational employment. It depends on the use of occupational patterns to distribute projected employment by industry. State Employment Security agencies have at their disposal time series of

Figure 2


BASE LINE SUPPLY DATA
DEVELOPMENT PROCESS FOR STATE TOTALS
STATE TOTALS
FORECAST BY V.E.P.D.
Occupational Projections through 1980 from National Industry-Occupational Matrix
Employment Data from covered Employers in Ohio -by Industry OBES - Research and Statistics
Agricultural Occupations - Bls Detailed Census Tapes
Supplemental Labor Survey Data from OBES
Conversion of DOT codes into educational taxonomy codes
State Total Estimates of one and five year employment needs. Base data derived from I-O matrix - supplemented and modified with OBES survey data.
Tentative Employment totals modified and adjusted from current knowledge of economic conditions
Input from supplemental sources (i.e. Agricultural surveys, Labor market information Bulletin, Business Research Bulletin (OSU), Manpower (OSDL), etc.
Review of current Manpower forecasting literature through ERIC searches
Total employment by educational taxonomy
1-year Labor market demand forecast
Cumulative 5-year Labor market demand forecast
Cumulative Rate of Growth over a 5-year period
Breakdown by county census into Vocational Education Planning Districts
Student enrollment used to breakdown county data where necessary
1- and 5-year forecasts by Vocational Education Planning District with anticipated Growth Rate

employment by industry for states and many local labor market areas.

These data for individual industries are analyzed, and their relationship to a number of independent variables is tested. That relationship which appears to offer the best explanation of movements in the local industry employment series is analyzed and used to project the particular industry employment series into the future. The projected occupational staffing pattern for the industry can then be applied to the projected industry employment level to obtain occupational employment projections.

The basic rationale behind the I-O Matrix is the expectation that overall changes in the demand for particular occupations is caused mainly by the differential growth rates of the industries primarily employing particular occupations. Various tests which have been made have supported this hypothesis.

Procedural Steps

The Bureau of Labor Statistics (1970) has estimated national industry-occupational matrices for the period 1970 to 1980. Staffing patterns are available for a number of occupations in the form of a percentage distribution of the total employment in each industry (Appendix A). These national matrices are now being used to project occupational employment for a number of different states.

In this process, the first step required the development of industry employment projections to 1980 for the state using the industries appearing in the national matrix. The next step involved multiplying the industry employment projections for 1980 by the 1980 national matrix, and multiplying the actual industry employment for 1970 by the 1970 national

matrix. The resulting products were then summed separately for 1970 and 1980 to obtain occupational totals for all industries combined. This procedure is illustrated in the following formula:

$$L_E = \frac{F_o(1980)}{F_o(1970)} \cdot \frac{E_{Lo}(1970)}{E_{LI}(1970)} = F_{LI}(1980)$$

L_E = Ohio's total number of carpenters in construction for 1980

$F_o(1980)$ = National fraction of all carpenters in construction for 1980

$F_o(1970)$ = National fraction of all carpenters in construction for 1970

$E_{Lo}(1970)$ = Ohio's number of carpenters in construction for 1970

$E_{LI}(1970)$ = Ohio's total employment in construction for 1970

$E_{LI}(1980)$ = Ohio's projected employment in construction for 1980

$$\text{Number of carpenters in construction for 1980} = \frac{.1310}{.1614} \cdot \frac{29,350}{200,210} \cdot 292,700$$

$$= 35,124$$

Next, the 1980 total for each occupation was divided by the 1970 total for the corresponding occupation in order to obtain occupational change factors for each occupation. Finally, the change factor for each occupation was multiplied by an independent estimate of 1970 state employment in the given occupation in order to obtain the projected 1980 state employment in the given occupation.

This basic method rests on two important assumptions. The first is that occupational distributions in major local industries are "reasonably similar" to the corresponding national distributions. The second assumption is that the relative errors in the numerator and denominator of the change factor (for a given occupation) will usually be of the same sign and approximately the same magnitude. The limited evidence currently available seems to indicate that both assumptions are sufficiently valid for most

states and for larger industrialized areas to allow reasonable judgements to be found on the basis of estimates produced by this method.

Projections, based upon the above techniques, describe past trends in employment by occupation and provide an extension of these trends into the future. Information about current job vacancies and data concerning future expected labor force are necessary in order to properly evaluate the employment projections and their implications for training.

A methodological manual has been prepared by the Manpower Administration of the Department of Labor for the use of State Employment Security agencies in making projections using the "regression-matrix" techniques described above (1969). Its purpose is to attempt to insure, at least, a minimum level of precision among the various states using these methods.

The manual covers the statistical methods needed for the industry employment projection process in great detail, with step-by-step instructions for their application. Also covered are efficient sampling methods for use in constructing local employer survey-derived staffing patterns with required levels of reliability. All operations required in using the national staffing patterns are detailed in a step-by-step fashion.

Limitations of Data Generated by the National I-O Matrix

A comparison of the information that can presently be provided at the local level with that which would be desirable reveals several noteworthy limitations. First of all, information on total job vacancies is not available for all major areas by occupation. In addition, a major limitation to the use of the I-O matrix for Vocational Education Planning is the lack of data for different educational taxonomies. It is estimated

that in Ohio, approximately 30-35% of the taxonomies do not have current employment data or occupational projections available. To supplement the I-O Matrix in certain of these taxonomies, local surveys will have to be made asking for employer projections of future labor needs.

Converting State-wide I-O Matrix Projections to Vocational Education Planning District Projections

Given these adjusted figures for major occupations in the state, the next step was to convert occupations into Education Taxonomies compatible with vocational education program offerings in Ohio. The H.E.W. - D.O.L. Conversion Handbook (1970) was used for this purpose, enabling a fairly simple conversion of occupational codes based on the Dictionary of Occupational Titles (D.O.T.) into educational taxonomy codes used by the Ohio Department of Education.

After converting taxonomy codes, the next major goal was to find some method of using state aggregate totals for manpower forecasting at the district planning level. Because manpower forecast data was not available in planning district form from the State Employment Services, the research staff decided to develop a formula based on several factors designed to estimate the percentage of total state employment for each vocational planning district.

Ohio is made up of approximately 108 vocational education planning districts (VEPDs) formed on the basis of cooperative agreements between local school districts. In order to develop estimates by planning district, it was necessary to use occupational breakdowns found in the 1970 U. S. Census by county. This breakdown gives a broad division of occupations into areas of trades and manufacturing, clerical and secretarial,

agriculture, service occupations, technical occupations, professional occupations, laborers, sales, transportation, health occupations, and managerial occupations. The total employment by county was updated by using the October, 1973, county employment provided by the Ohio Bureau of Employment Services. Since many vocational education planning districts contain several counties within their geographical areas or lie within a county, this data was useful in estimating what percentage of employment was contained within a planning district.

Where vocational planning district boundaries are contained within county boundaries it was decided to use the percentage of total student enrollment within a planning district to estimate employment openings within that district. This approach was based on the assumption that the percentage of total state student enrollment within a district was proportional to the percentage of total state employment within a district. This relationship might be expected, since the proportionate number of students in a VEPD would, in most cases, be similar to the adult working population based on residential surveys of employment (1970 Occupational Census).

Where it was possible to validate this approach, separate comparisons were made by comparing VEPD enrollment percentage with each county's current employment percentage. In all cases, it was found that the ratio of local enrollment compared to state enrollment totals was within ± 8% of county employment compared to state employment totals. This finding suggests that student enrollment does reflect, to a reasonable degree, the employment of the residents within that planning district.

The following examples may serve to illustrate the three types of planning

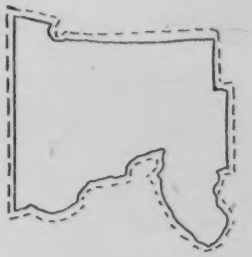
district conversions that were made:

1. Planning District A: The characteristic boundary lines of this planning district closely follow the county boundary lines for which occupational data is available. There may be minor deviations which can be accounted for by looking at enrollment within that deviation area (i.e. school district enrollment).

   Example: VEPD 086
   Scioto Co JVSD

   - - - - County line

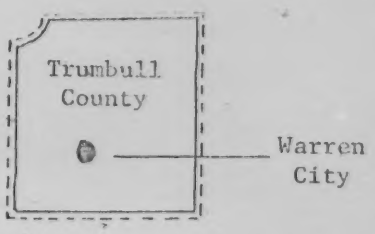
   _____ Planning District



   Methodology: Use straight county employment figures and correct for minor deviations.

2. Planning District B: Where several planning districts lie within one county.

   Example: VEPD 099 Trumbull Co JVSD
   VEPD 100 Warren City



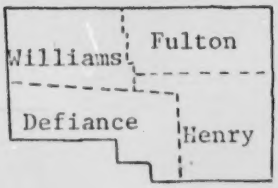
   Methodology: Use the percentage of students enrolled in each planning district. Multiply each percentage (PD_1, PD_2) by the total figures (C) for that county in each educational taxonomy. This method may be illustrated by the following formula:

   $C \times PD_1 = P_1$; $C \times PD_2 = P_2$

   C = total county employment
   PD_1 = % of students in VEPD 099
   PD_2 = % of students in VEPD 100
   P_1 = employment for VEPD 099
   P_2 = employment for VEPD 100

3. Planning District C: Planning districts whose geographical boundaries include several counties. (Example: see next page.)

Example: VEPD 030
Four County JVSD



Methodology: Add employment figures for each of the four counties included within VEPD 030. This method may be illustrated by the following formula:

$$P_1 = C_1 + C_2 + C_3 + C_4$$

where $C_1 - C_4$ represent the employment of each county involved in Planning District 030.

The above methodology was employed for the occupational service areas of Business and Office Education, Health, Trade and Industry, Technical Education, Home Economics and Distributive Education. A somewhat different methodology was used for agricultural production, management and agribusiness and technical occupations. This was necessitated by the fact that agricultural employment, for some educational taxonomies, follows a reverse pattern of population density. That is, a higher percentage of agricultural employment tends to be found in low-density population areas. Consequently, the use of straight-line projection methods for high-density population areas would be inappropriate. In addition, agriculture data from the I-O Matrix and from local surveys was quite limited, necessitating the use of different sources of information.

The 1969 Ohio Census of Agriculture (U.S. Department of Commerce) and the 1974 Ohio Directory of Manufacturers (Ohio Department of Economic Development) were two major sources used for this purpose. These publications enabled the breakdown of major agricultural groups (e.g. forestry, horticulture, food production, etc.) into county percentages where they could be converted into planning district distributions. An inverse population density was used for several taxonomies (e.g. Ag Production, animal science

farm management) where one would expect more employment in less populated areas.

Manpower Demand Print-Out

Each planning district percentage factor developed from county census data and student enrollment is multiplied by the state total projections. One- and five-year projections are computed, with a rate of growth indicated for the accumulated five-year totals (See Appendix B). The following table shows percentage growth rates for each of four categories:

Table 1

Rate of Growth	% Increase Over 5 Years
Slow	0-19
Moderate	19-34
Rapid	34-49
Very Rapid	49+

During the Spring training conferences held with local education agency planners, conferees were encouraged to modify labor market projections if they could substantiate differences with local documentation. Early feedback from these conferences suggested some weaknesses in several health taxonomies, probably due to the method of sampling covered employers in Ohio; i.e. because many small medical facilities and doctors' offices are not currently covered under Ohio's Unemployment Compensation Laws, they were not included in the projections of the I-O Matrix.

Vocational Enrollment Data by Educational Taxonomy

In addition to labor market demand data, conferees at the Spring Local

Education Agency Planning meetings were provided with a computer print-out of vocational enrollment in their planning district over the past three years (See Appendix C). The intent of this data was to provide information for tentative trend analysis and enrollment projections through 1979. As explained in the companion Local Education Agency Planning report, educational planners were asked to use past enrollment data, projected labor market demand data, and additional data input gathered at the local level to plan for future programs in their districts. The following section attempts to offer some simple guidelines for the use of student enrollment, labor market demand data and follow-up in vocational education planning.

IV. SOME SUGGESTED USES OF VOCATIONAL EDUCATION PLANNING DATA

Labor demand data on the computer print out is projected over one- and five-year periods to indicate the anticipated growth of each educational taxonomy. While primary emphasis might be given to the one-year projections in vocational planning (1975), the planner should also consider expected growth or decline over the remaining four-year period (1975-1979(. Because of the time lag involved in planning and implementing vocationl programs, he should allow a sufficient period of time for any new developments in the different service areas.

When deciding between a choice of expanding several currently operational programs in a local area, the planner should first check the current and past enrollments in that particular program. This data is available from the enrollment print-out provided each VEPD (Appendix C). Trend enrollment data should give some indication of how enrollment might continue to increase or decrease over the next five years, given that other factors

remain constant (e.g. available funds, student interest, space, etc.).

After a reasonably consistent trend is established for a taxonomy, the next step would be to check the projected labor market demand for one- and five-year projections (Appendix B) and compare these figures with current enrollment. While other sources of enrollment are not reported in this program (e.g. community college, proprietory schools, M.D.T.A., etc.), it could be estimated that an additional 15% of vocational school graduates in semi-skilled and skilled occupations come from non-public school secondary and post-secondary programs in Ohio. This percentage will vary within a planning district, depending on the number of schools in your area preparing vocational students for available occupations. This percentage should be added to the current enrollment figures on the enrollment report to accurately compare available supply with projected demand.

In addition to enrollment and labor market demand data, follow-up information should be examined closely to determine the percentage of students placed in field-trained and related occupations and their average salaries. The decision to increase or decrease training programs may then be made on the basis of past enrollment, projected available openings, and success in placing previous vocational graduates. Other information which may also be considered but is not covered in this report might include: estimated tax revenues and other funding sources, available physical facilities, student interests, availability of teaching staff, relatedness of different training programs to general academic preparedness, overall operational costs, etc. The following example may serve to illustrate a method for utilizing available data. (See Table 2.)

TABLE 2

Happy Trails Vocational Education Planning District

	Past Enrollment Planning Projections			Labor Demand Projections				1-Year Follow-up Data (Students available for work)				
	1972*	1973	1974	Current Employment	1-Year Need	5-Year Need	Rate of Growth (5-Year)	Continuing education in post-secondary training	Number of placements in field trained occupations	Number of placements in related occupations	Not Working	Average earning of students in field trained occupations (full time)
17.0301 Body & Fender Absorption Capacity (A.C.)	12	15	18(9)	144	16 1.8	82 9.1	Very Rapid	1	6	1	1	$ 2.65
17.0302 Auto Mechanics Absorption Capacity (A.C.)	37	40	43(22)	319	38 1.7	150 6.8	Rapid	2	10	5	5	$ 2.62
17.1502 Industrial Electronics Absorption Capacity (A.C.)	10	11	13(7)	101	9 1.3	46 6.6	Rapid	2	3	2	2	$ 3.14
17.1900 Graphic Arts Absorption Capacity (A.C.)	12	14	15(8)	177	9 1.1	19 2.4	Slow		1	2	4	$ 2.69

Suppose the decision is to be made to recommend increased funding for programs in T & I in a VEPD, and it is desirable to do this on a proportionate basis for each program. Because there are limited funds to invest, it must be decided which program increase would result in the greatest return on an investment. Student interest is high in the following programs: 1) 17.0301-Body and Fender, 2) 17.0302-Mechanics, 3) 17.1900-Graphic Arts, 4) 17.1502-Industrial Electronics. An Examination of Labor Demand Tables (MIS), enrollment data (MBO) and follow-up data would show the information for each of these taxonomies. (See Table 2.)

The next step would be to estimate the number of graduates expected from each program in one year (about 40-45% of total enrollment in two-year program). Using the conservative figure of 45%, this gives us an approximate total for anticipated 1974 graduates as follows (1974 enrollment x .45 = 1974 graduates):

Table 3

Adjustments for Estimated Graduates

17.0301	-	8
17.0302	-	19
17.1502	-	6
17.1900	-	7

Next, using a conservative estimate of 15% to account for other sources of labor supply, we obtain the following results (1974 graduates ÷ .85 = adjusted supply):

Table 4

Adjustments for Other Sources of Supply

17.0301	-	9
17.0302	-	22
17.1502	-	7
17.1900	-	8

Following the above adjustments, the vocational planner may then look at past and current enrollment, projected employment needs through 1979 and follow-up data to develop a plan. In the example, enrollment trend increases have been fairly consistent in all taxonomies except Graphic Arts. While enrollment initially increased in this area, it remained approximately the same from 1973 to 1974. An examination of projected labor demand for Graphic Arts appears to support this trend; that is, growth in Graphic Arts occupations will be slow over the next five years. In addition, follow-up information indicates a poor placement rate for Graphic Arts occupations during the previous year. While it appears that the labor market might be able to absorb the same level of supply for 1975, program increases over the next five years should not be recommended. In fact, decreases will probably have to be made over this period of time. This possibility should be further validated for the 1977-79 period with next year's periodic update of labor market demands.

An examination of the first three taxonomies (Body and Fender, Mechanics, Industrial Electronics) in Table 1 reveals a parallel increase in enrollment over the past three years. A look at labor demand projections for each taxonomy suggests that while Body and Fender shows a more rapid rate of increase than Mechanics over a five-year period, the absorption capacity (A.C.), or number of graduates the labor market could absorb in any one taxonomy, of both for 1975 is comparable. (Body and Fender A.C. = $\frac{16}{9}$ = 1.8; Mechanics A.C. = $\frac{38}{22}$ = 1.7) The A.C. for Industrial Electronics is the lowest at 1.1. In addition, a look at the placement record for Body and Fender shows a 56% placement rate in field trained occupations, highest of the four taxonomies listed here.

On the basis of the above differences, one might give a slight edge to

funding over the next two-year period for Body and Fender, since placement opportunities are greater in this occupation. For the period 1977-79, there is greater justification for the funding of Body and Fender programs as the five-year absorption capacity increases to 9.1 as opposed to 6.8 for Mechanics and 6.6 for Industrial Electronics.

If starting salary is a major concern to vocational graduates, one might also want to consider additional funding in Industrial Electronics. This factor would have to be weighed against the odds that placement potential is less favorable in Industrial Electronics than in Body and Fender or Auto Mechanics.

These examples serve to illustrate the types of decisions that can be made with the aid of a management information system. In all taxonomies except the Graphic Arts, there appears to be sufficient labor market demand to justify an increase in enrollment at the present 1974 level for each of the succeeding five years. The extent to which this level can be comfortably exceeded must be determined by the projected absorption rate for 1975 (1-year) and 1979 (5-year). In the case of Graphic Arts, a continued increase at the 1974 level of enrollment would result in an over-supply by 1976 or 1977. Consequently, a decrease in enrollment will most likely be necessary by this date.

It is also suggested that in taxonomies where there are minimal labor market needs forecasted (i.e. less than 10% a year), consideration be given to consolidating low demand occupations into a cooperative program. This would enable the maximum use of instructor time, classroom space, instructional materials, etc.

APPENDICES

APPENDIX A

NATIONAL INDUSTRY-OCCUPATIONAL MATRIX TABLES

NATIONAL INDUSTRY-OCCUPATIONAL EMPLOYMENT MATRIX, 1970 AND PROJECTED 1980
(PERCENT DISTRIBUTION OF INDUSTRY EMPLOYMENT BY OCCUPATION)

OCCUPATION	SAWMILLS MILLWORK MISC WOOD		FURNITURE AND FIXTURES		STONE,CLAY AND GLASS PRODUCTS		GLASS AND GLASS PRODUCTS		CEMENT, CONCRETE AND PLASTER	
	70 RATIO	80 RATIO	70 RATIO	80 RATIO	70 RATIO	80 RATIO	70 RATIO	80 RATIO	70 RATIO	80 RATIO
CLERICAL AND KINDRED WORKERS	6.69	7.54	9.67	10.41	10.88	11.20	10.31	9.05	10.09	11.48
STENOS, TYPISTS, SECRETARIES	1.52	1.91	2.38	2.77	2.63	2.51	2.60	2.17	2.23	2.38
OFFICE MACHINE OPERATORS	.20	.26	.44	.50	.46	.60	.37	.34	.35	.42
OTHER CLERICAL,KINDRED WRKRS	4.98	5.36	6.85	7.15	7.78	8.09	7.35	6.34	7.51	8.69
ACCOUNTING CLERKS	.27	.27	.27	.22	.45	.46	.37	.40	.51	.63
BOOKKEEPERS,HAND	.89	.91	.78	.68	.96	1.27	.12	.09	1.91	2.46
BANK TELLERS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CASHIERS	.02	.02	.01	.01	.05	.04	.09	.09	.04	.03
MAIL CARRIERS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
POSTAL CLERKS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
SHIPPING,RECEIVING CLERKS	.63	.71	1.73	1.88	.92	.78	1.13	1.03	.30	.31
TELEPHONE OPERATORS	.03	.03	.07	.07	.13	.16	.14	.14	.14	.19
CLERICAL AND KINDRED,NEC	3.13	3.42	3.99	4.28	5.26	5.37	5.28	4.58	4.60	5.07
SALES WORKERS	1.32	1.95	2.86	3.35	2.72	3.79	1.59	1.58	3.34	5.27
CRAFTSMEN,FOREMEN AND KINDRED	14.46	18.08	20.38	20.38	15.23	15.93	14.14	16.67	16.66	15.72
CONSTRUCTION CRAFTSMEN	2.32	3.50	2.18	3.44	2.35	2.45	1.26	1.36	3.62	3.17
CARPENTERS	1.66	2.59	1.99	3.32	.34	.37	.34	.35	.52	.54
BRICKMASONS AND TILE SETRS	.01	.02	.00	.00	.28	.26	.06	.06	.18	.12
CEMENT,CONCRETE FINISHERS	.04	.03	.00	.00	.14	.08	.00	.00	.35	.15
ELECTRICIANS	.24	.39	.11	.06	.80	.85	.52	.56	1.21	1.07
EXCAVATING,GRADNG MACH OPER	.25	.36	.01	.01	.56	.64	.03	.02	1.09	1.01
PAINTERS AND PAPERHANGERS	.06	.07	.06	.04	.04	.03	.01	.01	.08	.06
PLASTERERS	.00	.00	.00	.00	.01	.01	.00	.00	.01	.01
PLUMBERS AND PIPEFITTERS	.05	.04	.01	.01	.15	.17	.28	.33	.11	.12
ROOFERS AND SLATERS	.01	.02	.00	.00	.02	.02	.01	.02	.04	.03
STRUCTURAL METALWORKERS	.00	.00	.00	.00	.01	.02	.01	.01	.03	.05
FOREMEN NEC	4.01	4.56	4.87	5.55	4.94	5.00	5.23	5.99	4.32	4.05
METALWKNG CRAFTS EXC MECH	1.42	1.89	.93	.87	1.56	1.62	1.68	2.10	.85	.71
MACHINISTS AND RELATED OCC	.27	.31	.19	.19	.83	.86	.98	1.25	.47	.43
BLKSMITHS,FORGMN,HAMMERMEN	.02	.02	.01	.01	.03	.02	.02	.01	.04	.02
BOILERMAKERS	.00	.00	.00	.00	.01	.01	.01	.01	.00	.01
HEAT TREATERS,ANNEALERS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MILLWRIGHTS	1.02	1.25	.09	.05	.28	.29	.35	.49	.17	.13
POLDERS,METAL,EXC CORENKRS	.00	.00	.00	.00	.03	.04	.05	.11	.00	.00
PATTERNMAKERS,METAL,WOOD	.04	.04	.10	.09	.07	.07	.07	.03	.05	.05
ROLLERS AND ROLL HANDS	.00	.00	.00	.00	.02	.03	.00	.00	.00	.00
SHEET METAL WORKERS	.04	.05	.27	.22	.08	.04	.08	.06	.09	.03
TOOLMAKERS AND DIEMAKERS	.00	.00	.28	.33	.22	.26	.12	.14	.03	.03
PRINTING TRADES CRAFTSMEN	.04	.05	.04	.06	.00	.00	.00	.00	.00	.00
COMPOSITORS,TYPESETTERS	.04	.05	.03	.05	.00	.00	.00	.00	.00	.00
ELECTROTYPERS,STEREOTYPERS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ENGRAVERS EXC PHOTOENGRVR	.00	.00	.00	.00	.04	.05	.10	.09	.03	.05
PHOTOENGRVRS,LITHOGRAPHERS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PRESSMEN,PLATE PRINTERS	.00	.00	.01	.01	.01	.01	.02	.02	.00	.00
TRANSPORT AND PUB UTIL CRAFT	.02	.02	.00	.00	.02	.02	.02	.02	.02	.02
LINEMEN AND SERVICEMEN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LOCOMOTIVE ENGINEERS	.01	.01	.00	.00	.02	.02	.02	.02	.02	.01
LOCOMOTIVE FIREMEN	.01	.01	.00	.00	.00	.00	.00	.00	.01	.01
MECHANICS AND REPAIRMEN	1.83	2.50	1.90	2.24	4.19	4.78	3.78	4.77	5.61	5.63
AIRPLANE MECH AND REPAIRMN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOTOR VEHICLE MECHANICS	.08	.08	.02	.02	.26	.33	.14	.15	.52	.53
OFFICE MACHINE MECHANICS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RADIO AND TV MECHANICS	.00	.00	.01	.01	.01	.01	.00	.00	.00	.00
RR AND CAR SHOP MECHANICS	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00
OTHER MECHANICS AND REPAIR	1.74	2.41	1.87	2.21	3.92	4.46	3.64	4.62	5.09	5.10

OCCUPATIONAL DISTRIBUTIONS FOR THESE INDUSTRIES CONTINUED ON NEXT PAGE

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

LABOR DEMAND RELATED TO VOCATIONAL EDUCATION PROGRAMS
FEBRUARY 25, 1974

PLANNING DISTRICT:
#777 JVSD

TAXONOMY CODE	TAXONOMY NAME	CURRENT EMPLOYMENT	1-YEAR PROJECTED EMPLOYMENT NEED	5-YEAR ACCUMULATED EMPLOYMENT NEED	RATE OF PROJECTED GROWTH OVER 5 YEARS*
01.0000	AGRICULTURE	13,064	1,110	4,920	RAPID
01.0100	AG PRODUCTION	3,025	90	252	SLOW
01.0101	ANIMAL SCIENCE	105	9	108	VERY RAPID
01.0104	FARM BUS MNGMT				
01.0200	AG SUPPLIES	1,660	171	778	RAPID
01.0300	AG MECH	224	27	111	VERY RAPID
01.0400	AG PRODUCTS	1,622	170	794	RAPID
01.0500	HORTICULTURE	2,948	319	1,446	RAPID
01.0600	AG RES	2,501	254	1,086	RAPID
01.0699	OTHER AG RES				
01.0700	FORESTRY	979	62	346	RAPID
01.9900	OTHER AG				
04.0000	DISTRIBUTIVE	5,486	505	1,742	MODERATE
04.0100	ADVT SVCS	44	2	8	SLOW
04.0101	RADIO BROADCAST	11	0	2	SLOW
04.0102	TELEVISION				
04.0200	APPAREL & ACCES	160	14	56	RAPID
04.0300	AUTOMOTIVE	92	8	31	MODERATE
04.0400	FIN & CREDIT	27	2	9	MODERATE
04.0500	FLORISTRY	7	1	3	RAPID
04.0600	FOOD DISTRI.	462	56	115	MODERATE
04.0700	FOOD SVCS	647	62	248	RAPID
04.0800	GENERAL MDSE	967	92	367	RAPID
04.0801	MRKG MNGMT	3	0	1	RAPID
04.0802	PERSONNEL MNGMT	0	0	0	RAPID

* Refer to Page 7 for an explanation of Rate of Growth.

PLANNING DISTRICT:

#777

TAXONOMY CODE	TAXONOMY NAME	CURRENT EMPLOYMENT	1-YEAR PROJECTED EMPLOYMENT NEED	5-YEAR ACCUMULATED EMPLOYMENT NEED	RATE OF PROJECTED GROWTH OVER 5 YEARS
04.0900	HDWE BLDG MTRL	36	3	13	RAPID
04.1000	HOME FURNISHING	19	2	7	RAPID
04.1100	HOTEL & LODGING	15	1	4	MODERATE
04.1200	INDUSTRIAL MRKG	871	85	317	RAPID
04.1300	INSURANCE	182	17	65	RAPID
04.1400	INTL TRADE				
04.1500	PERSONNEL SVCS				
04.1501	VOC MUSIC				
04.1502	PERFORMING ARTS				
04.1600	PETROLEUM	385	11	84	SLOW
04.1700	REAL ESTATE	30	2	11	RAPID
04.1800	REC & TOURISM	78	5	19	MODERATE
04.1900	TRANSPORTATION	1,450	123	457	MODERATE
04.3100	OTHER WHOLESALE				
04.9998	OCC WORK ADJ				
07.0000	HEALTH OCC	1,176	132	554	RAPID
07.0101	DENTAL ASST	20	2	8	RAPID
07.0102	DENTAL HYGIENE	9	1	4	RAPID
07.0103	DENTAL LAB TECH	8	0	1	SLOW
07.0200	MED LAB TECH	25	3	12	RAPID
07.0201	CYTOLOGY				
07.0202	HISTOLOGY				
07.0203	MED LAB ASST	58	4	17	MODERATE
07.0204	HEMATOLOGY				
07.0301	NURSE ASSOC DEG	340	44	173	VERY RAPID
07.0302	PRACT VOC NURSE	178	24	97	VERY RAPID
07.0303	NURSES AIDE	464	43	213	RAPID
07.0304	PSYCH AIDE				
07.0305	SURGICAL TECH				
07.0306	OBSTET TECH				
07.0307	HOME HEA AIDE				
07.0308	SCH HEA AIDE				
07.0401	OCC THERAPY	15	2	7	RAPID
07.0402	PHYS THERAPY	16	1	6	RAPID
07.0403	PROSTHETICS				

PLANNING DISTRICT:
#177

TAXONOMY CODE	TAXONOMY NAME	CURRENT EMPLOYMENT	1-YEAR PROJECTED EMPLOYMENT NEED	5-YEAR ACCUMULATED EMPLOYMENT NEED	RATE OF PROJECTED GROWTH OVER 5 YEARS
07.0404	ORTHOTICS				
07.0501	RADIOLOGIC TECH	29	3	10	MODERATE
07.0502	RAD THERAPY				
07.0503	NUCL MED TECH				
07.0603	OPTOM ASST				
07.0701	ENV HEA ASST				
07.0702	RAD HEA TECH				
07.0703	SANITARIAN ASST				
07.0801	MENTAL HEA TECH				
07.0802	MENTAL RETARD				
07.0901	EEG TECH	2	0	1	RAPID
07.0902	ELCT-CARD TECH	2	0	1	RAPID
07.0903	INHALTN THERAPY	9	1	4	VERY RAPID
07.0904	MED ASST				
07.0905	CENTRAL SUPPLY				
07.0906	COM HEA AIDE				
07.0907	MED ENGY TECH				
07.0909	MORTUARY SCI				
07.0910	ORTHOPEDIC ASST				
07.0911	MED REC ASST				
07.0998	DIVERSIFIED HEA				
09.0000	HOME ECONOMICS	1,399	133	557	RAPID
09.0101	COMP HOMEMAKING				
09.0102	CHILD DEVELOP				
09.0103	CLOTHING & TEXT				
09.0104	CONSUMER EDUC				
09.0105	FAMILY HEA				
09.0106	FAMILY RELATION				
09.0107	FOODS & NUTRITN				
09.0108	HOME MNGMT				
09.0109	HOUSING & HM FRN				
09.0201	CHILD CARE	12	1	5	RAPID
09.0202	FABRIC SVC	412	31	121	MODERATE
09.0203	FOOD SVC	892	93	394	RAPID
09.0204	UPHOLSTERY WRKR				

PLANNING DISTRICT: PAGE: 4

#777

TAXONOMY CODE	TAXONOMY NAME	CURRENT EMPLOYMENT	1-YEAR PROJECTED EMPLOYMENT NEED	5-YEAR ACCUMULATED EMPLOYMENT NEED	RATE OF PROJECTED GROWTH OVER 5 YEARS
09.0205	COMM & HOME SVC	39	5	22	VERY RAPID
09.0213	CATERING SVC				
09.0223	BAKER	44	4	15	MODERATE
14.0000	BUS & OFF EDUC	4,026	320	1,340	MODERATE
14.0100	ACCOUNT & COMP	675	46	214	MODERATE
14.0200	BUS DP SYS	191	16	67	RAPID
14.0300	GENERAL OFF				
14.0301	DUPLICATING OPR	10	1	3	MODERATE
14.0302	CLERICAL SVCS	33	2	7	MODERATE
14.0303	OFF CLERK	1,309	113	476	RAPID
14.0399	OFF MACHS	4	0	2	RAPID
14.0400	INFO COMM OCC	391	24	97	MODERATE
14.0402	CORRESP CLERK				
14.0406	MED REC CLERK				
14.0500	MTRL SUPPORT	562	44	182	MODERATE
14.0600	PERSONNEL TRNG	46	2	7	SLOW
14.0700	STENO & SEC OCC	479	45	180	RAPID
14.0800	SUPVR & ADM	19	1	6	MODERATE
14.0900	TYPING & REL	295	25	97	MODERATE
14.9900	MISC OFF	11	1	3	MODERATE
16.0000	TECHNICAL EDUC	685	48	193	MODERATE
16.0101	AERON TECH				
16.0103	ARCHIT TECH				
16.0104	AUTOMOTIVE TECH				
16.0105	CHEM TECH	359	26	105	MODERATE
16.0106	CIVIL TECH	20	1	4	MODERATE
16.0107	ELECTRICAL TECH	107	7	28	MODERATE
16.0108	ELECTRONIC TECH	154	11	43	MODERATE
16.0109	EL-MECH TECH				
16.0110	ENV CONTR TECH	6	1	2	RAPID
16.0111	INDUSTRIAL TECH	30	1	3	SLOW
16.0112	INSTRUM TECH				
16.0113	MECH TECH				
16.0114	METAL TECH				

PLANNING DISTRICT:
#777

TAXONOMY CODE	TAXONOMY NAME	CURRENT EMPLOYMENT	1-YEAR PROJECTED EMPLOYMENT NEED	5-YEAR ACCUMULATED EMPLOYMENT NEED	RATE OF PROJECTED GROWTH OVER 5 YEARS
16.0115	NUCL TECH				
16.0116	PETROLEUM TECH	4	1	6	VERY RAPID
16.0118	WELDING TECH				
16.0119	MIN ENG TECH				
16.0120	CERAM ENG TECH				
16.0199	OTHER ENG TECH				
16.0601	COMM PILOT TRNG	7	0	1	SLOW
16.0602	FIRE & SAFETY				
16.0604	OCEANOG TECH				
16.0605	POLICE SCI TECH				
16.0606	GRAPH ART TECH				
16.0607	MECH DESGN TECH				
16.0608	PLASTICS TECH				
17.0000	TRADE & INDUSTR	9,014	757	2,985	MODERATE
17.0100	AIR COND & HEAT	32	2	10	MODERATE
17.0101	COOLING				
17.0102	HEATING				
17.0103	VENTILATING				
17.0200	APPL REPAIR	62	5	23	RAPID
17.0301	BODY & FENDER	144	16	82	VERY RAPID
17.0302	MECHANICS	319	38	150	RAPID
17.0303	SPECIALIZATION				
17.0400	AVIATION OCC				
17.0401	AIRCRAFT MAINT	37	0	2	SLOW
17.0402	AIRCRAFT OPER				
17.0403	GROUND OPER	11	1	6	VERY RAPID
17.0600	BUS MACH MAINT	22	1	9	RAPID
17.0700	COMM ART OCC	35	3	13	RAPID
17.0800	COMM FISH OCC				
17.0801	SEAMANSHIP	33	0	2	SLOW
17.0802	SHIP & BOAT OP	10	0	0	SLOW
17.0900	COMM PHOTO OCC	35	2	7	SLOW
17.1001	CARPENTRY	264	15	147	VERY RAPID
17.1002	CONSTR ELECT	203	17	78	RAPID
17.1003	HEAVY EQUIPMENT	232	17	69	MODERATE

PLANNING DISTRICT:
#177

TAXONOMY CODE	TAXONOMY NAME	CURRENT EMPLOYMENT	1-YEAR PROJECTED EMPLOYMENT NEED	5-YEAR ACCUMULATED EMPLOYMENT NEED	RATE OF PROJECTED GROWTH OVER 5 YEARS
17.1004	MASONRY	80	9	35	RAPID
17.1005	PAINT & DECOR	96	9	43	RAPID
17.1006	PLAST & DRYWALL	17	3	12	VERY RAPID
17.1007	PLMBG & PIPEFIT	158	16	97	VERY RAPID
17.1009	GLAZING	23	2	6	MODERATE
17.1010	ROOFING	17	2	8	RAPID
17.1011	BLDG MAINT	214	14	53	MODERATE
17.1012	INDUST MAINT	532	34	160	MODERATE
17.1013	RSL FLOOR LAYER				
17.1014	ASBESTOS WRKR				
17.1015	ELEVATOR MAINT				
17.1100	CUSTODIAL SVCS	926	80	320	RAPID
17.1200	DIESEL MECH	21	3	12	VERY RAPID
17.1201	MINE MAINT MECH				
17.1300	DRAFTING OCC	203	24	93	RAPID
17.1402	LINEMEN				
17.1403	MOTOR REPAIRMAN	12	2	8	RAPID
17.1501	COMM ELECT	78	6	23	MODERATE
17.1502	INDUST ELECT	101	9	46	RAPID
17.1700	MNGMT DEVEL	539	24	93	SLOW
17.1900	GRAPHIC ART OCC	177	9	19	SLOW
17.2000	CHEM LAB				
17.2001	INS OP MT REACT	97	4	14	SLOW
17.2002	RADIOGRAPHY				
17.2003	IND RAD-ISOTOPE				
17.2100	INSTR MAINT REP	105	4	14	SLOW
17.2301	FOUNDRY	117	7	34	MODERATE
17.2302	MACH SHOP	818	75	274	MODERATE
17.2303	MACH TOOL OPER	343	30	129	RAPID
17.2305	SHEET METAL	144	11	52	RAPID
17.2306	WELDING & CUTTING	339	30	116	MODERATE
17.2307	TOOL & DIE	262	27	115	RAPID
17.2310	IRON WORKER				
17.2400	METALLURGY OCC	27	4	17	VERY RAPID
17.2601	BARBERING				
17.2602	COSMETOLOGY	91	7	35	RAPID

PLANNING DISTRICT:
#777

TAXONOMY CODE	TAXONOMY NAME	CURRENT EMPLOYMENT	1-YEAR PROJECTED EMPLOYMENT NEED	5-YEAR ACCUMULATED EMPLOYMENT NEED	RATE OF PROJECTED GROWTH OVER 5 YEARS
17.2700	PLASTICS OCC	152	15	62	RAPID
17.2801	FIREMAN TRNG	121	4	25	MODERATE
17.2802	LAW ENF TRNG	347	28	122	RAPID
17.2804	SCH BUS DRIVER				
17.2903	MEAT CUTTER	170	13	43	MODERATE
17.3000	REFRIGERATION				
17.3100	SMALL ENG REPR	7	1	4	VERY RAPID
17.3201	EL PWR & GEN PL	62	3	13	MODERATE
17.3202	PUMPING PL	32	2	11	MODERATE
17.3203	HYDRAULIC OCC				
17.3400	LEATHERWORKING				
17.3500	UPHOLSTERING	17	1	5	MODERATE
17.3601	MILLWRK & CABNT	26	2	7	MODERATE
17.3602	WOOD PATTERNMK				
17.9901	OTHER T & I OCC	1,049	104	402	RAPID
17.9998	OCC LAB				
17.9999	OCC WORK EXPER				
	VEPD TOTAL	34,850	3,005	12,291	RAPID

* Rate of Growth is based on the following percentages:

SLOW	0-19% (over 5 years)
MODERATE	20-34%
RAPID	34-49%
VERY RAPID	50+%

APPENDIX C

PREVIOUS ENROLLMENT
BY EDUCATIONAL TAXONOMY

(MBO)

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1963	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
VEPD	T		2,490	5,025	2,748							2.51
	H		21	15	20							.63
	D		333	342	295							1110
	U		79.74	82.34	88.34							
01.0000 TOTAL AGRICULTURE	T		425	485	428						17.20	
	H											
	D		46	25							7.31	
	U		13.99	13.00	13.00							
01.0100 AG, PRODUCTION	T		303	257								
	H											
	D		26									
	U		7.74	5.01								
01.0101 ANIMAL SCIENCE	T											
	H											
	D											
	U											
01.0104 FARM BUS. MGT.	T			111	31							
	H											
	D											
	U		1.00	2.99	2.00							
01.0200 AG, SUPPLIES	T		43	49	25							
	H											
	D		20	25								
	U		2.00	2.00	1.00							
01.0300 AG, MECHANICS	T		47	43	42							
	H											
	D											
	U		2.25	2.00	2.00							
01.0400 AG, PRODUCTS	T											
	H											
	D											
	U											
01.0500 HORTICULTURE	T		17	25	24							
	H											
	D											
	U		1.00	1.00	1.00							

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM -- SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
01.0600 AG, RESOURCES	T											
	H											
	D											
	U											
01.0699 OTH AG RESOURCE	T											
	H											
	D											
	U											
01.0700 FORESTRY	T											
	H											
	D											
	U											
01.9900 OTHER AGRICULT.	T											
	H											
	D											
	U											
01.XXXX AG, MULTIPLES	T				306							
	H											
	D											
	U				7.00							
01.0100 AG, PRODUCTION	T				242							
	H											
	D											
	U											
01.0104 FARM BUS, MGT,	T				64							
	H											
	D											
	U											
04.0000 TOTAL DIST, EDUC,	T		103	122	111						4.33	
	H		2		1							
	D		61	78	74						22.81	
	U		5.00	6.00	6.00							
04.0100 ADVERTISING	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT MP-D	PCT STATE
04.0101 RADIO BROADCAST	THDU											
04.0102 TELEVISION	THDU											
04.0200 APPAREL & ACC.	THDU											
04.0300 AUTOMOTIVE	THDU											
04.0400 FINANCE	THDU											
04.0500 FLORISTRY	THDU											
04.0600 FOOD DISTRIB.	THDU											
04.0700 FOOD SERVICES	THDU											
04.0800 GEN MERCHANDISE	THDU											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1963	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *R-D	PCT *STATE
04,0801 MKT MANAGEMENT	T											
	H											
	D											
	U											
04,0802 PERSONNEL MGT.	T											
	H											
	D											
	U											
04,0900 HARDWARE BLDG.	T											
	H											
	D											
	U											
04,1000 HOME FURNISHING	T											
	H											
	D											
	U											
04,1100 HOTEL & LODGING	T											
	H											
	D											
	U											
04,1200 INDUSTRIAL MKT.	T											
	H											
	D											
	U											
04,1300 INSURANCE	T											
	H											
	D											
	U											
04,1400 INT. TRADE	T											
	H											
	D											
	U											
04,1500 PERSONAL SERVS.	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM -- SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
04.1501 VOCATIL MUSIC	T											
	H											
	D											
	U											
04.1502 PERFORMING ARTS	T											
	H											
	D											
	U											
04.1600 PETROLEUM	T											
	H											
	D											
	U											
04.1700 REAL ESTATE	T											
	H											
	D											
	U											
04.1800 REC & TOURISM	T											
	H											
	D											
	U											
04.1900 TRANSPORTATION	T											
	H											
	D											
	U											
04.2100 OTHER WHOLESALE	T											
	H											
	D											
	U											
04.9998	T		61	78	74							
CCC, WORK ADJ.	H		2		1							
	D		61	78	74							
	U		3.00	4.00	4.00							
04.XXXX	T		42	44	37						1.56	
D.E. MULTIPLES	H											
	D											
	U		2.00	2.00	2.00							

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
04.0100 ADVERTISING	T		1		1							
	H											
	D											
	U											
04.0200 APPAREL & ACC.	T		3	3	4							
	H											
	D											
	U											
04.0300 AUTOMOTIVE	T		3	1	2							
	H											
	D											
	U											
04.0600 FOOD DISTRIB.	T		8	13	2							
	H											
	D											
	U											
04.0700 FOOD SERVICES	T		7	7	6							
	H											
	D											
	U											
04.0800 GEN MERCHANDISE	T		18	16	10							
	H											
	D											
	U											
04.1600 PETROLEUM	T		2	4	4							
	H											
	D											
	U											
07.0000 TOTAL HEALTH OCC.	T		60	75	69						2.66	
	H		1									
	D		3.00	4.00	4.00							
	U											
07.0101 DENTAL ASST.	T		21	17	18							
	H											
	D											
	U		1.00	1.00	1.00							

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-O	PCT *STATE
07.0102 DENTAL HYGIENE	THDU											
07.0103 DENTAL LAB TECH	THDU											
07.0200 MED. LAB TECH.	THDU											
07.0201 CYTOLOGY	THDU											
07.0202 HISTOLOGY	THDU											
07.0203 MED. LAB ASST.	THDU											
07.0204 HEMATOLOGY	THDU											
07.0301 NURSE ASSOC DEG	THDU											
07.0302 PRACT.VOC.NURSE	THDU		19 1 1.00	34 2.00	33 2.00							

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
07.0303 NURSES AIDE	T											
	H											
	D											
	U											
07.0304 PSYCH AIDE	T											
	H											
	D											
	U											
07.0305 SURGICAL TECH,	T											
	H											
	D											
	U											
07.0306 OBSTET. TECH	T											
	H											
	D											
	U											
07.0307 HM. HEALTH AIDE	T											
	H											
	D											
	U											
07.0308 SCH. HEALTH AIDE	T											
	H											
	D											
	U											
07.0401 OCC. THERAPY	T											
	H											
	D											
	U											
07.0402 PHYS. THERAPY	T											
	H											
	D											
	U											
07.0403 PROSTHETICS	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM -- SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P=D	PCT *STATE
07.0404 ORTHOTICS	T											
	H											
	D											
	U											
07.0501 RADIOLOG. TECH.	T											
	H											
	D											
	U											
07.0502 RADIATION THER.	T											
	H											
	D											
	U											
07.0503 NUC. MED. TECH.	T											
	H											
	D											
	U											
07.0603 OPTOMETRY ASST.	T											
	H											
	D											
	U											
07.0701 ENVIR. HEALTH	T											
	H											
	D											
	U											
07.0702 RADIO. HEALTH	T											
	H											
	D											
	U											
07.0703 SANITARIAN ASST	T											
	H											
	D											
	U											
07.0801 MENTAL HEALTH	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
07.0802 MENTAL RETARD.	T											
	H											
	D											
	U											
07.0901 EEG TECHNICIAN	T											
	H											
	D											
	U											
07.0902 ELECTROCARD TEC	T											
	H											
	D											
	U											
07.0903 INHALATION THER	T											
	H											
	D											
	U											
07.0904 MEDICAL ASST.	T		20	24	18							
	H											
	D											
	U		1.00	1.00	1.00							
07.0905 CENTRAL SUPPLY	T											
	H											
	D											
	U											
07.0906 COMMUN. HEALTH	T											
	H											
	D											
	U											
07.0907 MED. EMERGENCY	T											
	H											
	D											
	U											
07.0909 MORTUARY SCI.	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *R-D	PCT *STATE
07.0910 ORTHOPEDIC ASST	T											
	H											
	D											
	U											
07.0911 MED. RECS. ASST	T											
	H											
	D											
	U											
07.0998 DIVERSIFID HLTH	T											
	H											
	D											
	U											
09.0000 TOTAL HOME EC.	T		1,167	1,354	1,363						48.01	
	H		15	8	16						53.33	
	D		30	45	42						13.16	
	U		19.75	22.00	23.00							
09.AAAA TOTAL HM.MAKING	T		1,082	1,266								
	H		15	8								
	D		28	44								
	U		14.75	17.00								
09.0101 COMP HM.MAKING	T		900	921								
	H		15	8								
	D		20	37								
	U		12.35	12.33								
09.0102 CHILD DEVELOP.	T											
	H											
	D											
	U											
09.0103 CLOTHING & TEXT	T		15	49								
	H											
	D											
	U		.25	.60								
09.0104 CONSUMER EDUC	T		12	26								
	H											
	D											
	U		.20	.41								

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
09.0105 FAMILY HEALTH	T											
	H											
	D											
	U											
09.0106 FAMILY RELAT'S.	T		86	101								
	H											
	D		3	4								
	U		1.00	1.25								
09.0107 FOODS & NUTRIT.	T		32	112								
	H											
	D		5	3								
	U		.50	1.75								
09.0108 HOME MANAGEMENT	T		25	30								
	H											
	D											
	U		.25	.25								
09.0109 HOUSE &HME FURN	T		12	27								
	H											
	D											
	U		.20	.41								
09.0198 FAMILY LIVING	T											
	H											
	D											
	U											
09.0199 FAMILY LIVING	T											
	H											
	D											
	U											
09.BBBB TOTAL JOB TRAIN.	T		67	70	75							
	H											
	D			1								
	U		4.00	4.00	4.00							
09.0201 CHILD GUID&CARE	T		32	34								
	H											
	D			1								
	U		2.00	2.00	2.00							

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DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1968	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P.D	PCT *STATE
09.0202 FABRIC SERVICE	T											
	H											
	D											
	U											
09.0203 FOOD SERVICE	T		35	36	35							
	H											
	D											
	U		2.00	2.00	2.00							
09.0204 UPHOLEST. WORK.	T											
	H											
	D											
	U											
09.0205 COMM&HOME SERV.	T											
	H											
	D											
	U											
09.0213 CATERING SERV.	T											
	H											
	D											
	U											
09.0223 BAKER	T											
	H											
	D											
	U											
09.XXXX HOME EC MULTIPLE	T		18	18	1,208						.64	
	H				16							
	D		2		42							
	U		1.00	1.00	19.00							
09.0101 COMP HM.MAKING	T				634							
	H				13							
	D				35							
	U											
09.0103 CLOTHING & TEXT	T				195							
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P.D	PCT *STATE
09.0104 CONSUMER EDUC	T				29							
	H											
	D											
	U											
09.0106 FAMILY RELAT'S.	T				127							
	H				1							
	D				5							
	U											
09.0107 FOODS & NUTRIT.	T				151							
	H											
	D				2							
	U											
09.0109 HOUSE &HME FURN	T				7							
	H											
	D											
	U											
09.0202 FABRIC SERVICE	T		2									
	H											
	D		1									
	U											
09.0203 FOOD SERVICE	T		10	13	11							
	H											
	D		1									
	U											
09.0205 COMM&HOME SERV.	T		6	3	4							
	H											
	D											
	U											
14.0000 TOTAL B.O.E.	T		231	255	248						9.04	
	H			3	3						20.00	
	D		33	45	44						13.16	
	U		13.00	13.34	14.34							
14.0100 ACCT. & COMPUT.	T		54	40	30							
	H			1	1							
	D		17		3							
	U		3.00	2.00	2.00							

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DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
14.0200 BUS.DATA PROCES	T		37	36	33							
	H			1								
	D			1								
	U		2.00	2.00	2.00							
14.0300 OFFICE FILING .	T											
	H											
	D											
	U											
14.0301 DUPLICATG OPER	T		15	20	29							
	H				1							
	D			3	2							
	U		1.00	1.00	2.00							
14.0302 CLERICAL SERVS.	T		16	33	35							
	H											
	D		16	33	35							
	U		1.00	2.00	2.00							
14.0303 OFFICE CLERK	T		30	14	15							
	H											
	D											
	U		2.00	1.00	1.00							
14.0399 OFFICE MACHINES	T											
	H											
	D											
	U											
14.0400 INFO.COM. OCC.	T											
	H											
	D											
	U											
14.0402 CORRESPOND CLRK	T											
	H											
	D											
	U											
14.0406 MED. RECORDS	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
14.0500 MATLS. SUPPORT	T											
	H											
	D											
	U											
14.0600 PERSONNEL TRNG.	T											
	H											
	D											
	U											
14.0700 STENO.&SEC. OCC	T		40	44	37							
	H			1	1							
	D			2	2							
	U		2.00	2.00	2.00							
14.0800 SUPER.ADMN.OCC.	T											
	H											
	D											
	U											
14.0900 TYPING&RELATED	T			37	38							
	H											
	D											
	U			1.34	1.34							
14.9900 MISC. OFFICE	T											
	H											
	D											
	U											
14.XXXX B.O.E MULTIPLES	T		39	31	31						1.10	
	H			6	2						1.75	
	D											
	U		2.00	2.00	2.00							
14.0100 ACCT. & COMPUT.	T		7	6	6							
	H			2	1							
	D											
	U											
14.0200 BUS.DATA PROCES	T		2	1	2							
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1972 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
14.0301 DUPLICATG OPER	T		1									
	H											
	D											
	U											
14.0303 OFFICE CLERK	T		14	11	6							
	H											
	D			2								
	U											
14.0399 OFFICE MACHINES	T		1									
	H											
	D											
	U											
14.0400 INFO.COM. OCC.	T				1							
	H											
	D											
	U											
14.0406 MED. RECORDS	T				1							
	H											
	D											
	U											
14.0600 PERSONNEL TRNG.	T				1							
	H											
	D											
	U											
14.0700 STENO.&SEC. OCC	T		4	3	3							
	H											
	D											
	U											
14.0900 TYPING&RELATED	T		8	8	11							
	H											
	D			2	1							
	U											
14.9900 MISC. OFFICE	T		2	2								
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
17.0000	T		512	529	529						18.76	
TOTAL T & I	H		4	4							26.67	
	D		162	149	135						43.57	
	U		25.00	24.00	28.00							
17.0100	T				28							
AIR & HEATING	H											
	D											
	U				1.00							
17.0101	T											
COOLING	H											
	D											
	U											
17.0102	T											
HEATING	H											
	D											
	U											
17.0103	T											
VENTILATING	H											
	D											
	U											
17.0200	T											
APPLIANCE REP.	H											
	D											
	U											
17.0301	T		40	48	38							
BODY & FENDER	H			1								
	D											
	U		2.00	2.00	2.00							
17.0302	T		47	50	42							
MECHANICS	H		1	1								
	D											
	U		2.00	2.00	2.00							
17.0303	T											
SPECIALIZATION	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM -- SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
17.0400 AVIATION OCCUP.	T											
	H											
	D											
	U											
17.0401 AIRCRAFT MAINT.	T											
	H											
	D											
	U											
17.0402 AIRCRAFT OPER.	T											
	H											
	D											
	U											
17.0403 GROUND OPER.	T											
	H											
	D											
	U											
17.0600 BUS.MACH.MAINT.	T											
	H											
	D											
	U											
17.0700 COMMERCIAL ART	T											
	H											
	D											
	U											
17.0800 COMMER. FISHERY	T											
	H											
	D											
	U											
17.0801 SEAMANSHIP	T											
	H											
	D											
	U											
17.0802 SHIP&BOAT OPER.	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM -- SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
17.0900 COMM.PHOTOGRPHY	T											
	H											
	D											
	U											
17.1001 CARPENTRY	T		44	49	50							
	H		1									
	D		3									
	U		2.00	2.00	3.00							
17.1002 CONSTR. ELECT.	T											
	H											
	D											
	U											
17.1003 HEAVY EQUIPMENT	T											
	H											
	D											
	U											
17.1004 MASONRY	T											
	H											
	D											
	U											
17.1005 PAINT. & DECOR.	T											
	H											
	D											
	U											
17.1006 PLAST.& DRYWALL	T											
	H											
	D											
	U											
17.1007 PLUMMING	T											
	H											
	D											
	U											
17.1009 GLAZING	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
17.1010 ROOFING	T											
	H											
	D											
	U											
17.1011 BUILD. MAINT.	T				19							
	H											
	D											
	U				1.00							
17.1012 INDUST. MAINT.	T											
	H											
	D											
	U											
17.1013 FLOOR LAYER	T											
	H											
	D											
	U											
17.1014 ASBESTOS WORKER	T											
	H											
	D											
	U											
17.1015 ELEVATOR MAINT.	T											
	H											
	D											
	U											
17.1100 CUSTODIAL SERV.	T											
	H											
	D											
	U											
17.1200 DIESEL MECHANIC	T											
	H											
	D											
	U											
17.1201 MINE MAINT.MECH	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 1, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
17.1300 DRAFTING OCCUP	T		28	24	26							
	H											
	D		1									
	U		1.00	1.00	1.00							
17.1402 LINEMAN	T											
	H											
	D											
	U											
17.1403 MOTOR REPAIRMAN	T											
	H											
	D											
	U											
17.1501 COMMUNICATIONS	T											
	H											
	D											
	U											
17.1502 INDUST. ELECT.	T		48	43	33							
	H		1									
	D											
	U		2.00	2.00	2.00							
17.1700 FOREMANSHIP	T											
	H											
	D											
	U											
17.1900 GRAPHIC ARTS	T		33	36	33							
	H											
	D											
	U		2.00	2.00	2.00							
17.2000 CHEMICAL LAB.	T											
	H											
	D											
	U											
17.2001 REACTORS	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

STATE OF OHIO
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *R_D	PCT *STATE
17.2002 RADIOGRAPHY	T											
	H											
	D											
	U											
17.2003 RADIOISOTOPES	T											
	H											
	D											
	U											
17.2100 INSTRUMENTS	T											
	H											
	D											
	U											
17.2301 FOUNDRY	T											
	H											
	D											
	U											
17.2302 MACHINE SHOP	T		37	45	47							
	H											
	D		2									
	U		2.00	2.00	2.00							
17.2303 MACHINE TOOL	T											
	H											
	D											
	U											
17.2305 SHEET METAL	T											
	H											
	D											
	U											
17.2306 WELD.& CUTTING	T		41	47	34							
	H		1	2								
	D											
	U		2.00	2.00	2.00							
17.2307 TOOL & DIE	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH, SURVEY, EVALUATION AND EXEMPLARY PROGRAMS

DATA CENTER

PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM - SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
17.2310 IRON WORKER	THDU											
17.2400 METALLURGY	THDU											
17.2601 BARBERING	THDU											
17.2602 COSMETOLOGY	THDU		38	38	37							
			2.00	2.00	2.00							
17.2700 PLASTICS OCCUP.	THDU											
17.2801 FIREMAN TRAIN.	THDU											
17.2802 LAW ENFORCEMENT	THDU											
17.2804 SCH.BUS DRIVER	THDU											
17.2903 MEAT CUTTER	THDU											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

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MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
17.3000 REFRIGERATION	T											
	H											
	D											
	U											
17.3100 SM.ENG. REPAIR	T											
	H											
	D											
	U											
17.3201 ELECTRIC POWER	T											
	H											
	D											
	U											
17.3202 PUMPING PLANTS	T											
	H											
	D											
	U											
17.3203 HYDRAULIC OCCUP	T											
	H											
	D											
	U											
17.3400 LEATHERWORKING	T											
	H											
	D											
	U											
17.3500 UPHOLESTERING	T											
	H											
	D											
	U											
17.3601 MILLWORK	T											
	H											
	D											
	U											
17.3602 WD PATERNMAKING	T											
	H											
	D											
	U											

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MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *P-D	PCT *STATE
17.9901 OTHER T & I OCC	T											
	H											
	D											
	U											
17.9998 OCCUP. LAB.	T											
	H											
	D											
	U											
17.9999 OCC. WORK EXP.	T		156	149	135							
	H		156	149	135							
	D		8.00	7.00	7.00							
	U											
17.XXXX T & I MULTIPLES	T				16							
	H											
	D				1.00							
	U											
07.0303 NURSES AIDE	T				2							
	H											
	D											
	U											
17.0303 SPECIALIZATION	T				4							
	H											
	D											
	U											
17.1001 CARPENTRY	T				2							
	H											
	D											
	U											
17.1004 MASONRY	T				1							
	H											
	D											
	U											
17.1007 PLUMMING	T				1							
	H											
	D											
	U											

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PLANNING PROJECTIONS FOR MANAGEMENT BY OBJECTIVE SYSTEM -- SECONDARY LEVEL
MARCH 4, 1974

TAXONOMY	PROG	1965	ACTUAL 1972	ACTUAL 1973	OPERATING 1974	1975	1976	1977	1978	1979	PCT *PROD	PCT *STATE
17.1013 FLOOR LAYER	T				3							
	H											
	D											
	U											
17.1700 FOREMANSHIP	T				2							
	H											
	D											
	U											
17.2802 LAW ENFORCEMENT	T				1							
	H											
	D											
	U											
99.0000 TOTAL SPECIAL	T			2,205								
	H											
	D											
	U											
99.0100 CAREER EXPLOR.	T			407								
	H											
	D											
	U											
99.0101 CAREER ORINET.	T			453								
	H											
	D											
	U											
99.0102 CAREER MOTIVAT.	T			1,345								
	H											
	D											
	U											
99.0300 ORIENT. 102B	T											
	H											
	D											
	U											
99.0310 ORIENT. PARTB	T											
	H											
	D											
	U											

* PERCENTAGE CALCULATIONS BASED ON ACTUAL 1973 DATA WITHOUT 99.0000 SPECIAL

APPENDIX D

V.E.P.D.s IN OHIO

VOCATIONAL EDUCATION PLANNING DISTRICTS

9/6/74 AK

APPENDIX E

PROJECT EVALUATION PLAN

EVALUATION PLAN FOR EPDA PROJECT #73011

Following are objectives for evaluating this project:

Objective 1 - to evaluate selected state supervisors ability to accomplish the following tasks:

1) to identify, evaluate, and utilize pertinent management information data in vocational education planning at both the state and local level.

2) To effectively assist local education agency staff in utilizing management information system data in local planning.

Objective 2 - to evaluate the effectiveness of a program designed to generate and integrate into a management information system labor market supply and demand data compatible with vocational education taxonomies.

Objective 3 - to measure the accuracy of labor market forecasts over 1 and 5 year periods, projected at the vocational education planning district level.

Following are steps to accomplish these objectives:

Step 1 - The first two goals will be evaluated by administering a rating form to selected state supervisors who have been involved in both state-wide and local planning. Using a 5-point Likert Scale, questions will be designed to measure their successes and failures in understanding and utilizing management information systems data in vocational education planning.

Step 2 - Several questions designed to assess local educators' understanding and use of management information systems data will be incorporated in a questionnaire to be administered at the local education planning conferences held in the spring. These questions will also be based on a 9-point Likert Scale.

Step 3 - In order to effectively measure the accuracy of labor market demand forecasts, it will be necessary to compare projected employment for 1975 and 1979 with actual employment in those years. Measurement of actual employment in various taxonomies will have to be accomplished in these target years. This can be done when yearly updates on the state plan are in process.

While there is some disagreement on what an acceptable standard error of measurement is for this purpose, it has been decided to use ± 8% for total service area projections and ± 10% for individual taxonomy projections. Most research suggests these to be acceptable limits for manpower forecasting with the national occupational-industry matrix.

PRELIMINARY EVALUATION RESULTS FOR EPDA PROJECT #73011

The following results are presented in three sections; the evaluation of the fall MIS Conference; the evaluation of the spring LEAP Conferences, relevant to manpower demand data; and, a rating scale completed by state directors and supervisors following project completion.

An Evaluation of the Fall MIS Conference

A rating scale was administered at the end of the conference with eight specific items that were covered in the conference and several spaces for participants to add items. The following results were obtained as participants responded by checking worthwhile, could be improved, or should be eliminated (figures represent the percentage of participants checking each column).

Program (N=144)	worthwhile	could be improved	should be eliminated
Introduction and Background	76%	23%	1%
Keynote Speaker	89%	11%	
A National Perspective	55%	35%	10%
Presentation of Internal/External Data	68%	28%	4%
Service Meetings-Discussion	79%	18%	3%
Analysis and Synthesis	72%	26%	2%
Luncheon Speaker	82%	18%	
Tuesday P.M. Session	75%	20%	5%

In addition to the above rating, many excellent comments were added in the space provided, including some good suggestions for any subsequent conferences.

An Evaluation of the Spring LEAP Conference (Manpower Demand Data Only)

One question was included in the evaluation for the companion LEAP conferences held in the spring of 1974. On the question of whether Manpower Supply and Demand Projections were meaningful and useful to local education agency planners, the following responses were obtained on a nine-point Likert Scale (column headings represent the four different regions of the state where the conferences were held).

Northwest	Southwest	Southeast	Northeast
5.70	5.97	6.41	6.32
(N=38)	(N=54)	(N=71)	(N=60)

An Evaluation of Manpower Demand Data Used in the Spring LEAP Conferences

The attached rating scale was administered to a random sample of state level supervisors and assistant directors who participated in the planning conferences and who used data generated by this project in vocational education planning. A sample of 21 raters responded with mean scores for each factor indicated on the rating scale.

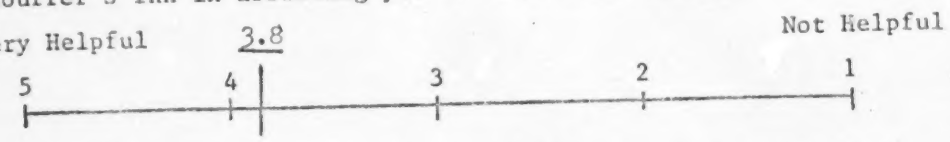
A review of the results indicates the highest rating to be on the question of how helpful the manpower forecast data was to state level planners in projecting vocational education programs over the next five years. Lowest responses, but still above average, were on questions six and seven dealing with the judged accuracy of the manpower forecasts. This appears somewhat incongruous since the raters also felt that the data was quite useful in their planning. Perhaps some of this incongruity can be explained

by the tendency to reject specific occupational projections on the local level if they appeared seriously out of line with local information about that occupation. The remaining projections were used with reasonable confidence after rejecting the few that were out of line.

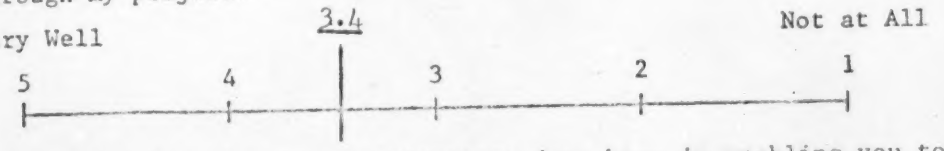
AN EVALUATION OF EPDA PROJECT #73011
John M. Showalter

Please read each question and circle the appropriate number indicating your response: (Mean responses for raters are indicated above each scale)

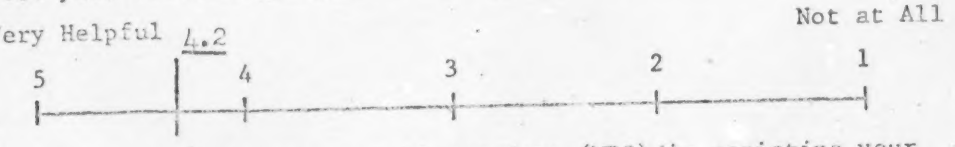
1. How helpful were the fall and spring state conferences held at Stouffer's Inn in assisting you in vocational education planning?



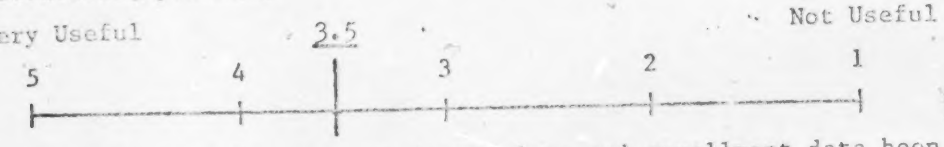
2. How well do you understand the manpower forecast data generated through my project?



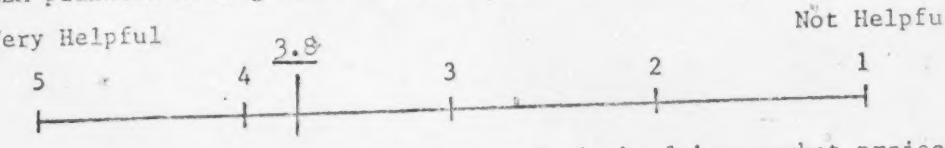
3. How helpful has the manpower forecast data been in enabling you to project your vocational education programs over the next five year period?



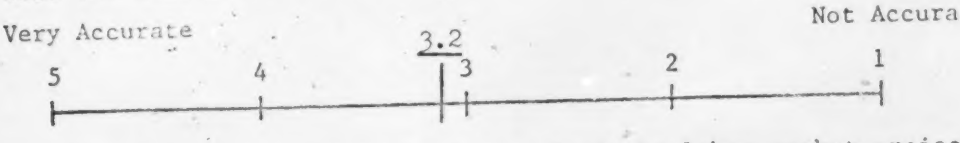
4. How useful was the past enrollment data (MRO) in assisting your educational planning?



5. How helpful has the manpower demand data and enrollment data been to LEA planners during the series of LEAP conferences held this spring?



6. In your opinion, how accurate do you feel the labor market projections were for individual VEPDs?



7. In your opinion, how accurate do you feel the labor market projections were at the state level?